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Teaching and Learning Ethics using an Audience Response System: Experiences from a Planning Perspective

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Abstract

Live lectures are some of the most common learning experiences for students, yet may be alienating and unequal learning spaces for students. This paper reports the literature review and preliminary experiences of a project, **Audience Response Systems ENhancing interAction in Lectures (ARSENAL)**. This initiative sought to increase student interaction with the lecturer and input into an ethics module. The project investigated the specific use of TurningPoint for Level 5 students of planning and property development. The methodological approach taken was action research, building on the notion of the value of critical reflection for continuous professional development (Biggs, 1999). The paper details the innovation, assesses the use of the technology, and suggests ways in which audience response systems might help make the live lecture learning environment more inclusive and interactive.

Keywords: Audience Response System, Lectures, Interactive Learning, E-learning

Introduction

Live lectures are one of the most public forms of teaching and a fact of life for most students. Yet, Race (1999, p.20) notes that they are “often described as a relatively inefficient way of promoting student learning, motivation and involvement”. Moreover, the traditional lecture theatre may even feel like – or be perceived by students as – an exclusive learning space for a number of reasons. Active student interaction and participation can vary depending on, for example, learning styles and aptitudes, previous classroom experiences, age, skill and confidence levels, and cultural background. A reluctance to communicate orally within a lecture theatre may stem from a lack of preparation or background knowledge or a concern about what other students might think. Those who are shy or who may feel threatened by the ‘mass’ lecture experience thus remain silent.

Lectures can become one-way communication (Butler, 1992), and risk becoming dissatisfactory, notably because the lecturer cannot be sure that the lecture material is being communicated effectively as there is no immediate feedback loop. It follows that the potential advantages of teaching and learning in a live environment are likely to be weakened by a lack of lecturer-student interaction. Moreover, with the increasing use of presentation software such as Microsoft PowerPoint as a lecture visual aid, it is salutary to note Race’s observation (1999) that students may not remember much of what they see during a lecture. He argues that it is therefore important to create self-contained ‘episodes’ that may be complemented by learning by doing, such as through helping students to do things with the information on the screen, or devising ‘Q&A’ sessions.

Following Schön (1987), the underlying logic informing the project is that one needs to reflect on one’s own educational practice as one teaches, and literally enacts ‘knowledge-in-use’, in the lecture theatre. This ‘thinking on one’s feet’ requires endeavouring to remain alert as to whether or not one’s teaching is ‘on track’. This process of critical reflection may take place in very different time-frames as one steps back “either in the midst of action or after the action is completed” (Zeichner and Liston, 1996, p. 9). Experience of asking questions in class and finding that the lecture theatre remains silent – or dominated by the student in the front row – prompted this search for a new mode of informed reflection.

The project was based on a teaching and learning strategy that adopted a two-pronged approach. First, this initiative sought to explore a method of checking student understanding and engagement in the immediacy of the act of lecturing through the use of interactive technology. Second, and over a longer time-frame, the project sought actively to describe and reflect more critically about the ‘on the spot’ actions associated with the live and real time lecturing activity. The methodological approach sought to solicit student feedback and build in the practice of peer observation.

There are a number of potential tools in the lecturer's technological armoury which may be used to enhance the student learning and teaching experience. The purpose of the project, **Audience Response Systems ENhancing interAction in Lectures (ARSENAL)**, was to test an audience response system (alternatively called a personal, electronic or classroom response system). A review of published literature demonstrates that audience response systems are increasingly being used in higher education (Fies and Marshall, 2006; Kennedy and Cutts, 2005). Research accounts indicate that audience response systems can: increase attendance within class (Judson and Sawada, 2002); encourage passive learners to become more active (Guthrie and Carlin, 2004); enhance knowledge retention (Poulis *et al.*, 1998); increase the meeting of learning outcomes (Kennedy and Cutts, 2005); offer anonymity, and provoke self-reflection (Gormley-Heenan and McCartan, 2009). Importantly, distinctions are made between taught subjects, such as aspects of physics and engineering, where, for example, there may be 'right/wrong' answers, and subjects where differences in opinion exist or judgment needs to be exercised.

The different potential uses of audience response systems suggested that it may be beneficial to better understand the potential of this technology in the built environment educational context. Building on earlier research examining student-teacher interactions using the Flanders' (1970) Interactive Analysis Categories (Peel and Shortland, 2004), and which focused on human interactions (talking, listening, asking/answering questions) the ARSENAL project thus aimed to assess the learning impacts of audience response technology in actively engaging students in learning about ethics.

The selected audience response technology trialed in the ARSENAL project was TurningPoint, which works by inserting interactive slides within Microsoft PowerPoint. The technology enables students to participate in presentations or lectures by submitting responses to interactive questions using a ResponseCard keypad. Research evidence suggests that using classroom-generated student response data through this medium provides real-time audience input that can be used in a number of ways to support both teaching and learning (Guthrie and Carlin, 2004). For example, students can offer an answer anonymously without the potential embarrassment of speaking in front of the rest of the class or be seen to be 'getting it wrong'. Furthermore, with larger classes, it is often hard for the lecturer to reach and engage all students in an inclusive way, effectively making it an unequal learning space. The premise for the research was that this technology has the potential to overcome such problems since all students can respond simultaneously and anonymously. More significantly, perhaps, lecturers can gather immediate feedback on whether a class has grasped a piece of information or whether the material needs re-explanation and clarification. This immediacy resonates with Schön's (1983, 1987) heat of the moment experience where concrete evidence can support the relatively more intuitive and tacit artistry of the reflective practitioner and better ground thinking on one's feet.

Project Conceptual Framework

A critical element in the design of the teaching and learning strategy and the decision to trial an audience response system during the module, Ethics and Professional Practice, stemmed from the perceived benefits of anonymity and self-reflection offered through the use of this technology (Gormley-Heenan and McCartan, 2009). This suggested that the tool is particularly appropriate to the complexity and sensitivities of the topic being taught since it deals with fundamental conflicts in values (Campbell, 1996), and negotiation of meaning (Morell, 2004). Following Draper *et al.* (2002), care was therefore taken in the research design to make use of the clear conceptual links between the learning situation and the technical solution being tested, the lecturer's personal dedication to Continuing Professional Development (CPD), related issues concerning research ethics, and a commitment to find a more inclusive way of encouraging each student to become more personally and directly involved in the lecture experience.

The pilot thus sought to use the multiple choice and survey slides to help students to build their confidence and reflective skills by encouraging self-assessment in relation to the cohort and to begin to challenge their opinions and assumptions about planning and the environment as being universally shared. An underlying objective was to use this second year undergraduate module as a stepping-stone towards developing a habit of CPD in line with the module learning outcomes and the programme's accrediting professional bodies which subscribe to models of continually monitoring and enhancing professional competence.

Project Aim and Objectives

The overarching aim of this pilot project was to critically examine the use of audience response technology in the built environment classroom. The element of the project being reported here involved fifty students over a 12 week period. This paper deals with two of the project's four objectives:

Objective 1: To solicit student feedback on the potential benefits or disadvantages of integrating TurningPoint into lectures (i.e. does it address Race's (1999) concerns about student learning, motivation and involvement?).

Objective 2: To complement the use of PowerPoint with TurningPoint technology in order to test the benefits of real time audience participation in providing instant feedback on lecture delivery and student understanding (i.e. does it provide an evidence base to inform Schön's (1983) reflection-in-action?).

Project methodology

Action Research

The methodology deployed in this project was action research, building on the notion of the value of critical reflection for CPD (Biggs, 1999). Following Cohen *et al.* (2000, p. 226), action research is held to act as “a powerful tool for change and improvement at the local level” and can be used for CPD purposes by improving skills, developing new methods of learning, increasing powers of analysis, and heightening self-awareness. Osterman and Kottkamp (1993, p. 19), for example, argue that: “reflective practice [offers...] a means by which practitioners can develop a greater self-awareness about the nature and impact of their performance, an awareness that creates opportunities for professional growth and development”. Action research can thereby offer a mode of self-study which not only supports individuals to enhance their teaching practices, but also to challenge assumptions (McNiff, 2002). It further provides opportunities to challenge and reflect on the values and beliefs that inform action in the classroom through careful collection of data and critical self-interrogation. Moreover, reflective practice may be enhanced when undertaken through reflective dialogue (Brockbank and McGill, 1998) and in collaboration with peers (Peel and Shortland, 2004). Peer review then provided an opportunity to critically reflect on the use of the technology with colleagues.

The specific action research approach adopted for the project was based on Zuber-Skerritt's (1996) C.R.A.S.P. model. This comprises five iterative and mutually reinforcing elements. These are: (1) a **C**ritical attitude to one's teaching practice; (2) a commitment to **R**esearch into teaching (through action research); (3) a desire to retain personal **A**ccountability through self-directed reflection and study; (4) **S**elf-evaluation (including control of input into appraisals, and publication); and (5) **P**rofessionalism, demonstrated by systematic involvement in educational research, theory, practice, and dissemination. In short, ARSENAL was first driven by personal relevance (the perceived need to enhance student engagement in lectures). Second, it was informed by an appreciation of context, that is, that the students were studying ethics and professionalism and beginning to engage with the concept of CPD.

Pilot Project

Prior to securing funding, a pilot project using TurningPoint was carried out with the class in order to test the viability of using the technology for a whole module and to provide a base-line assessment of the extent to which students feel that they can participate and engage in lectures. A student survey carried out in semester one (academic year 2008/9) questioned students about their perceptions of what makes for an effective lecture. This survey was informed by a literature review and synthesised the approaches and findings deployed by Maunder and Harrop (2003), Mulligan and

Kirkpatrick (2000) and Badger *et al.* (2001) in their own investigations into student perceptions and constructions of learning in lectures (Appendix 1).

Student comments from the open-ended questionnaire survey clearly supported the need for this study. Notably, the findings showed that many students like lectures for what they “learn about a topic”, although the majority of students “do not feel involved”. The nature of the responses confirmed that many students dislike the “size of the class”, generally wish for “more interaction with the lecturer and other students”, and like “question and answer sessions”. Several mentioned that they “hate being singled out by a lecturer” or “put on the spot”. Some highlighted a dislike of having certain students “use the lecture for debating” and thereby dominating a lecture. Several students commented on the “length” of lectures, and need for the lecturer to be “dynamic”, do “more than read the information on the PowerPoint slides”, and to have “more visual” stimulants. Following a subsequent trial of the key-pad devices with the same cohort two weeks later, the majority of the students suggested they did want to use the technology the following semester.

TurningPoint Technology: Getting Started

The selection of TurningPoint as the classroom response system was based on the institution’s experience of this particular technology. There are several competing audience response systems available to higher education institutions, and most offer similar facilities and functions. TurningPoint was chosen because it integrates within Microsoft PowerPoint, by including a TurningPoint ‘toolbar’. This means there is a gentle learning curve for most academic staff who are already familiar with PowerPoint. To create a ‘question’ slide, users simply click on the slide template from a dropdown list, and then add text in the text boxes, in the same way they would on any PowerPoint slide. The technology is specifically designed to be used to ask a range of different questions (including True/False, Yes/No, Multiple Choice, and Likert scale).

Once the slides are prepared, users simply run the presentation slideshow, in the same way they would with any PowerPoint presentation. When a TurningPoint slide is shown, a toolbar pops up to tell the audience they can ‘vote’ and their responses are collected and displayed when the presenter clicks to move on. Average responses for each answer will be displayed in a chart on the slide. Questions can be answered anonymously, or it is possible to use the unique ID of each transmitter to identify participants using a Participant List. This facility means that each student may be directly identified with a specific key-pad and illustrates why this technology is sometimes used for assessment purposes, or even for monitoring attendance. This ‘policing’ option was not the intended use in this project and this was made clear to the students as paper-based class-lists are taken at each session.

In-class responses are collected via a USB receiver which plugs into the USB slot of the PC or laptop. In comparison to PowerPoint, TurningPoint presentations take

roughly the same time to set up and run – the only added factor is the USB receiver. At the time of writing, transmitters cost approximately £20 each, whilst the USB receivers cost £300. Thus for a class of 40 students, a 'kit' may cost roughly £1100, excluding VAT. The software to create presentation slides is available free from the manufacturer's website.

The resources involved in this project related to the purchase of the key-pads and receiving devices. It was decided that each student would be loaned a personal keypad upon payment of a £20 deposit. This was for two reasons: first, this was to ensure that each student took ownership of the tool; second, it enabled the data collection to be optimised by linking results with individual students with the *potential* for monitoring on a weekly basis. Support in using the technology was initially provided by the Project Coordinator (Technology Adoption) of the University's Information Services Department. Initial support is recommended because, while the technology is highly reliable, and there were few technical problems over the course of the project, there are other issues which may arise when the system is first used, such as familiarisation with the equipment for both staff and students, controlling the time taken to present and poll questions, and getting used to the initial 'noise' generated by the students who will begin talking to each other about the topic once a question is displayed on-screen. Yet, this 'noise' is part of the very interaction with the topic one may be trying to generate. In practice, the students found no difficulty using the key-pads and student discussions enlivened debates in a focused way.

Project Delivery

There were two main reasons for trialling the audience response system in the Ethics and Professional Practice module. First, the teaching and learning strategy sought to engage students in discussions about interpretations of sustainable development. Here, the insights of Campbell (1996), for example, are important since this thinking draws attention to the dilemmas involved in reconciling economic, environmental and social objectives. Campbell (1996) explains these tensions by way of a triangle of competing societal priorities, highlighting that different individuals place different values on diverse developmental aspects. Specific use was made of survey and questionnaire materials in relation to subjects such as ethical consumerism or public trust in professionals in order to generate a set of TurningPoint questions. Students were asked to indicate their own response to a specific question. The topic was then discussed in the light of a range of responses when the cohort's results were viewed. These findings were then contrasted with the findings from relevant public surveys. This enabled different views to be aired and contrasted in a non-threatening way with alternative perspectives highlighted and explained by the lecturer. It further assisted students to visualise and reflect on the different value systems people hold and begin to appreciate the socially constructed nature of knowledge in this context.

Second, TurningPoint was used to stimulate student engagement with a number of directed reading tasks addressing professional behaviours and conduct in planning and property development. This aspect of the project involved embedding a number of multiple choice questions into selected PowerPoint slides each week which tested the students' understanding of preparatory reading tasks and related materials. Specified readings addressed ethical and professional issues across the built environment enabling a range of issues to be addressed around, for example, health and safety (Vee and Skitmore, 2003); trust (Swain and Tait, 2007), different types of unethical behaviour within business and public sector contexts (Kyarimpa and Garcia-Zamor, 2006), communication (Wells and Spinks, 1996), the role of locally elected councillors and standards in public life (Stott, 1998), and personal responsibility and whistle-blowing in planning and property development (Burley, 2005). The use of TurningPoint effectively enabled revision to be carried out in class, as well as facilitating discussion around individual points, such as definitions, interpretations and implications (Figure 1).

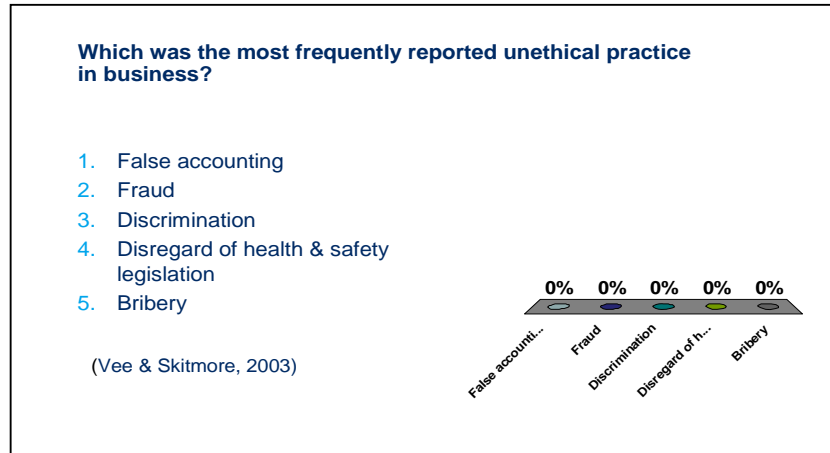


Figure 1: TurningPoint example of a multiple choice question

The technology thus enables both multiple choice (factual) questions and relatively more opinion based questions to be asked. Importantly, then, it tended to be the questions where there was no 'right' answer but where everyone had an opinion that allowed some of the contested issues around development decisions to be discussed. Critically, the electronic response system enabled everyone to participate by expressing a view even if not everyone had an opportunity to speak to the whole class. An important feature of this approach was that reading the article before each lesson allowed students to check their learning and assess their progress during class. Later, student examination scripts made considerable use of the directed reading, suggesting that this approach had contributed positively to students' appreciation of these ideas.

Project Evaluation

Three approaches to gathering feedback were deployed. Following the available methodologies reported in the published research noted above, data to support the

evaluation of ARSENAL were derived from anonymous (qualitative) feedback by the students (in-class individual feedback and open-ended group-developed feedback); and in-class peer review from two colleagues in cognate disciplines (law and property investment and development). The focus of the peer evaluation turned on examining the class dynamics through classroom observation of those sessions where TurningPoint was used. A particular challenge with this type of small-scale action research relates to the extent to which such interventions can be seen to improve the learning experience, and for which students. No control group was used; rather the technology was used as part of an arsenal of teaching aids which were specifically aimed at enhancing the lecture experience for both students and the lecturer. The technology was not used specifically in relation to attendance, although it was made clear to students that the lecturer could use the technology to examine performance on a weekly basis and identify where additional support could be provided. A particular incentive for attending class related to the weekly completion of a reflective diary so it is not clear whether the response system directly affected attendance. Indeed, the reflective diary became an important vehicle for developmental feedback and became a fourth mechanism for obtaining student comment in relation to TurningPoint. Students commented positively on how this tool had impacted their learning in their individual diary entries.

The next section reports the insights derived from the students' feedback in relation to Objective 1. This was concerned with soliciting student feedback on the potential benefits or disadvantages of integrating TurningPoint into lectures and seeking to better understand Race's (1999) concerns about student learning, motivation and involvement in this context.

Student Feedback

Feedback from the students was obtained through two direct methods: (i) individual class feedback using the TurningPoint technology itself; and (ii) small group 'SWOT' analyses. At a mid-point (Week 7), the students were simply asked on a yes/no basis the following question: "In general, have you found using TurningPoint helps your sense of interacting in lectures?" 92 percent (i.e. 37 out of 40 students) said yes. A second question asked the students how they felt that the technology helped their learning. This revealed that all the students found the tool had variously helped them to check what they knew, retain their attention, visualise the answer which helped them to retain the issue better, and understand the point being made through it being discussed by the lecturer. Nobody felt that TurningPoint had inhibited their learning.

In Week 9, an in-class paper-based focus group discussion was organised during which students used a SWOT template to offer their perspectives on the use of the technology in enhancing lecturer-student interaction (Table 1). This qualitative feedback confirms many of the earlier findings reported in the published literature, but

clearly identifies some of the potential concerns students may have about the use – or over use of the technology.

Table 1: TurningPoint Student Group Feedback [No: 32 students (in groups of 2-4)]

<p>Strengths</p> <ul style="list-style-type: none"> Class participation increased (2) Encourages interaction Confirms attendance Teacher can follow student progress Good for revision Class can voice their opinion and offer feedback No one is singled out in front of the class (2) Adds some diversity to the class Everyone has equal say Kept involved (2) Don't have to talk in class Allows those too shy to speak out to give their opinions Outlet for class participation Kept awake Anonymous Awareness of topic TurningPoint doesn't make you feel embarrassed if you get the answer wrong Saves the embarrassment if you are not certain of the answer It's easier to participate in class Makes you pay attention more/Helps with attention Allows you to see where you are making mistakes Individual progress can be monitored Helps in making people do reading Reiterates points from reading – helps you to remember 	<p>Weaknesses</p> <ul style="list-style-type: none"> (Had to pay for it) Can forget to bring it (2) People could not be truthful Can't correct mistakes if push wrong button Tied down to one answer Limited options Limited response Only certain number of answers Although people need to learn to communicate effectively and this might act as a barrier Discourages oral communication in class No verbal interaction Copying Time consuming waiting on responses Due to anonymity people could give 'fake' answers and therefore not try Over usage could become monotonous WebCT notes are not efficient as only half are used – prefer the last year method of missing words to be filled
<p>Opportunities</p> <ul style="list-style-type: none"> Use it more often Guest speakers could use it (2) Interaction Class participation Could be used for exams Overall view of class Comparison of performance Collate individual answers of students See where you're going wrong See where improvements are needed 	<p>Threats</p> <ul style="list-style-type: none"> Can lose it (4) Leaving/forgetting key pad at home (3) People forget to bring them to class (3) Forgetting the keypad this may give impaired results Being tied down to one answer Guessing answer Might break Students pressing other students' keypads

Peer-informed Critical Reflection

Objective 2 of the research sought to examine the use of TurningPoint as a way to enhance teaching decisions by the lecturer in the heat of the moment through real time audience participation. The intention was to collect evidence so as to be able to critically reflect on whether TurningPoint provided a less intuitive and more informed cue for the need for action. This private reflection was complemented by peer observation and feedback in order to offer a peer review dimension to the initiative.

Peer Feedback

The TurningPoint pilot was observed by two colleagues interested in potentially using the technology for teaching in the built environment. Importantly, none of the lecturers involved in this project had any prior experience of using this technology. Peer observation focused on trying to capture the interactions in the class between the lecturer and the students around the visual aid, PowerPoint. In a previous study on classroom interaction, one of the authors had used Flanders' (1970) Interactive Analysis Categories (Peel and Shortland, 2004). This categorisation is relatively complex and is concerned with examining teacher-pupil verbal interactions in ten categories. In the ARSENAL project, peers were asked to note down their perceptions of students' physical signs of engagement/attentiveness in the class. Peer observations were annotated using PowerPoint notes pages. Comments relating to those slides where the audience response technology was used were then compared with those where the technology was not used in order to reflect on how the classroom dynamic noticeably changed from those slides where student input was not solicited. Undertaking the exercise at different points in the semester allowed any novelty factor to be reduced.

Peer Observer 1 made comments in relation to the first week where the technology was new. These classroom observations indicated that when TurningPoint was used there was greater interaction and movement in the class with some students discussing the issues. This 'positive activity' was noted by the lecturer undertaking the review as involving the students being alert with high levels of activity and the students appearing to be concentrating hard. There was a strong sense that students' attention span was extended, although two students maintained a private conversation. Notwithstanding the very visual aspects of TurningPoint, the peer reviewer also noted high levels of listening and that in addition some students took notes.

Peer Observer 2 commented on Week 8 when the class were more familiar with the lecturing style, topic and technology. This lecturer's feedback offers a different dimension on the tool's potential. On the one hand, the technology appears to provide a good vehicle for assessing students' understanding of previously learned material. On the other, it can serve to gauge the immediate impact on students' understanding of new material and enable students to see their standing amongst their peers. As such,

TurningPoint provides immediate feedback and enables a lecturer to reinforce an area that students find difficult. Clearly, the tool has specific benefits in the particular topic area of planning and property as regulatory and developmental interventions have diverse impacts on places and people and individuals hold different views about the consequences of such actions. Feedback from Peer Observer 2 was that TurningPoint offers further potential to engage students more in relation to the survey results provided during the class and to better tease out the reasons underpinning the students' answers. Furthermore, for this lecturer, the key to the use of the technology is that responses are anonymous and that this encourages students to participate and engage more. The overall view was that this approach works both ways, offering positive outcomes for both the lecturer and students thereby helping to improve the teaching and the students' learning.

Lecturer Reflections: Informal Student Feedback

An indirect method for the lecturer to gain further insights into individual students' perceptions of the value of the technology emanated from the students' personal reflections in their on-line journals entered on a Personal Development System. This assessed weekly diary entry assignment required students to document and reflect on their insights and observations in relation to the module learning outcomes. This formed part of the development of the professional skill of reflection and the need to develop an ability to manage personal development planning and CPD. Providing weekly/fortnightly feedback as a mentor provided an opportunity for the lecturer to read the students' reflections on the module delivery. Not all the students commented on the use of the technology as this was not a learning outcome *per se*. Those who did comment, however, supported and encouraged the use of the technology and illustrated the extent to which talking about the innovation with the students made this a participative and interactive experiment. This was explicitly couched as an example of the lecturer's own CPD.

Importantly, then, the interactions between lecturer and students were synchronous and asynchronous, providing for numerous opportunities to enhance the teaching materials and respond to student feedback. This was both real time – heat of the moment – teaching and more quietly reflective self-questioning, prompted by the more private diary entries. Taken together, these modes of receiving student feedback during each class and reading the associated diary entry offered detailed and rich feedback on the students' understanding and emotional reactions to the teaching. Indeed, one of the most interesting insights to be derived from this experiment is how detailed and insightful the student feedback is in relation to the style of interaction, and the potential weaknesses of the technology if it is over-used or where the answers provided are inadequate. It confirms that students are diversely attuned to aspects of the learning process and, based on this experience, are keen to participate in a dialogue about how to enhance the lecture learning environment. Indeed, the student survey showed an

awareness that the technology might reduce discussion. From an anonymous survey, however, it is not possible to identify whether these comments are from relatively more confident students who do not find lectures a threatening environment. Clearly, care must be taken not to silence those students who do wish to comment in class, but it is important to provide opportunities for those who find the lecture environment more daunting.

There remain very practical questions as to the extent individual lecturers are able to be flexible and responsive to 'content' during lecture delivery – in addition to the preparation phase. What the technology does offer, however, is the scope to integrate cohort responses in an iterative way so that earlier input can be incorporated and re-used. The staged input by colleagues through the peer review process also enabled some fine-tuning of the visual aids and the approach to using the technology. In terms of reflection-in-action, the experience of using TurningPoint certainly deepened the physical evidence of student understanding through immediate feedback which demanded a spontaneous, 'in the heat of the moment' response by the lecturer.

Conclusions

This project sought first to gain a better understanding of contemporary student engagement in lectures and their motivations for attending and participating in lectures and, second, to improve classroom interaction through synchronous feedback by the cohort. The audience response technology experiment offered a positive experience for students and staff in that it revealed the potential for immediate feedback and relatively more inclusive participation by the cohort in a comparatively easy, informal and discreet way.

This paper has provided some background in relation to the technical and resource requirements of using this type of technology and the nature of the learning curve involved in using the equipment; indeed, it is important not to overlook the time and effort needed to innovate in this way. Significantly, developing slides and questions is a helpful exercise in enhancing class materials and thinking about how best to create active episodes to stimulate student debate and reflection during lectures.

In a practical way, this small action research project has sought to illustrate how using an audience response tool as an integral part of a teaching and learning strategy can help to enrich the learning experience, and diffuse some of the fears that students have about responding and volunteering information in class. It is anticipated that this can help some students to overcome their shyness and ensure that the lecture theatre becomes a less intimidating learning space. This means the lecture is no longer dominated by the lecturer and (possibly) a few students. In short, by working with the students' responses and inputs in this way, such technology can make for a dynamic and more interactive learning space. By offering an alternative mode for everyone to engage in and shape the lecture content, it would appear that the vast majority of the

students considered this to be a very positive learning experience. Indeed, this cohort advocated using the technology again in a different module. An important challenge, and one that some of the students themselves identified, is nevertheless to ensure that verbal interaction and oral communication are still encouraged and developed, and to help all students to build their confidence in communicating effectively. It is important that the tool does not supplant that very human interaction it is intended to nurture.

In helping to enhance teaching practice the timing of the use of this technology may be important. One of the challenges of TurningPoint is that it demands lecturers think deeply about how to create opportunities for students to learn by doing. Indeed, Gormley-Heenan and McCartan (2009) highlight the extent to which the use of the TurningPoint feedback is helpful in providing lecturers with the necessary information to modify their teaching early in a module's delivery to better meet the diversity of students' abilities and needs. This highlights that teaching and learning materials need to be flexible in format in the short and medium term to respect the diversity of student requirements. The very immediacy and dynamism created by the technology is key. Here, Simpson and Oliver (2007), for example, caution that audience response systems demand lecturers understand the contextual and practical realities of this technology as an active learning tool. This effectively necessitates an active teaching model that requires a robust understanding of the subject material, an ability to improvise in response to student needs, and confidence in the use of the technology. This informed reflection highlights, perhaps, the essence of *inter-action* in the development of a productive lecturer-student relationship in lecture environments.

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Appendix 1

A TurningPoint in Enhancing Student Participation in Lectures?

STUDENT QUESTIONNAIRE

This short questionnaire is being used to *consult* you on your views about lecturing and to help identify what you feel makes lectures interesting and useful for you in your learning.

The answers, which are mainly open-ended, are intended to be used to help to explore new ways of lecturing and to inform the design of a small *research project* to improve student learning.

Please indicate which course you are on, but do not put your name on the survey form as the questionnaire is designed to be anonymous.

Thank you for your help. Any queries please ask XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

Which course are you on? (*Please tick*) ☐ PID ☐ UPPD/PPD

Are you a full time or part time student? ☐ F/T ☐ P/T

1. What do you like most about lectures?
2. In general, how do you prepare for lectures?
3. How do you use your lecture notes?
4. What, if anything, do you dislike about lectures?
5. What do you personally hope to get out of your lectures?
6. In what ways do you feel that you are involved in a lecture?
7. In what ways do you think lectures could be improved?
8. From your experience, how do you think students learn best in a lecture?
9. What activities would help you to learn better during your lectures?